Research Article

e-ISSN: 2710-2122, p-ISSN: 2710-2114
2025: Vol 7(1), pp 1-12. https://doi.org/10.38140/ijer-2025.vol7.1.05
Interdisciplinary Journal of Education Research

Student Teachers' Perceptions of Artificial Intelligence Chatbots for Classroom Practices: An Interpretative Phenomenological Analysis

Paseka Patric Mollo[1*]

AFFILIATIONS

[1]Faculty of Humanities, Central University of Technology, Bloemfontein, South Africa.

CORRESPONDENCE

Email: pmollo@cut.ac.za*

EDITORIAL DATES
Received: 30 June 2024
Revised: 09 September 2024
Accepted: 30 November 2024
Published: 25 February 2025

DOI: 10.38140/ijer-2025.vol7.1.05

Abstract: This paper examines student teachers' understanding of Artificial Intelligence (AI) chatbots and their application in teaching and learning practices. A qualitative research methodology, specifically Interpretative Phenomenological Analysis (IPA), was employed to explore student teachers' perceptions of AI chatbots. A purposive sampling strategy was used to select eleven (11) student teachers in their fourth year of study for a B.Ed. degree at the University of Technology in South Africa. To interpret and analyse student teachers' perceptions of the use of AI chatbots in their teaching and learning practices, data analysis was conducted using Systematic Text Condensation (STC) in a five-step process. The study explored themes aligned with the knowledge dimensions of the Technological Pedagogical Content Knowledge (TPACK) framework. Findings revealed a generally limited understanding among student teachers regarding artificial intelligence, particularly chatbots. Although some learners in schools use chatbots, student teachers still lack the knowledge to utilise these technological systems for teaching practices. This includes, among other things, using AI chatbots to transform classrooms into personalised learning environments for classroom management and student analytics. In a nutshell, an AI chatbot for classroom purposes can serve as a diligent administrative assistant, an Indigenous planner, and enhance pedagogical practices. These findings underscore the need for further research and training to improve student teachers' knowledge and utilisation of AI chatbots in the classroom.

Keywords: Artificial Intelligence, chatbots, student teacher, Technological Pedagogical Content Knowledge, classroom practices.

1. Introduction

Humans have long been labelled the most intellectual of all living things due to their cognitive abilities. Human intelligence enables various cognitive functions, including thinking, learning, reasoning, comprehension, perception, judgment, and conclusion drawing (Kaya & Bulut, 2022). With the introduction of computers, there has been much curiosity regarding whether certain cognitive qualities that have historically been considered unique to humans can also be achieved by machines (Kaya & Bulut, 2022). The use of technology in education has progressed considerably with the advent of Artificial Intelligence (AI), a system of machines designed to emulate human capabilities (Tahiru & Agbesi, 2021). Simply put, AI refers to a machine's ability to simulate human cognitive functions and perform tasks that typically require human intelligence, including perception, reasoning, learning, problem-solving, and natural language understanding. Artificial intelligence operates using algorithms and data (Thomas, 2020). In the realm of AI, machine learning allows computers to learn from vast amounts of data and gradually generate predictions and recommendations without explicit programming instructions (Kaya & Bulut, 2022; Tahiru & Agbesi, 2021; Thomas, 2020).

Conversely, deep learning is a subset of machine learning that mimics the human brain's learning process by using artificial neural networks, which are algorithms and computing units inspired by

How to cite this article:
Mollo, P. P. (2025). Student teachers' perceptions of artificial intelligence chatbots for classroom practices: An interpretative phenomenological analysis. *Interdisciplinary Journal of Education Research,* 7(1), a05. https://doi.org/10.38140/ijer-2025.vol7.1.05

the human brain (Tahiru & Agbesi, 2021). It has shown promising results in various applications, including natural language processing (NLP) and image recognition (Tahiru & Agbesi, 2021; Thomas, 2020). As part of AI, NLP is a machine learning technology that enables machines to process, interpret, and understand human language.

AI is evolving, and its applications are expanding at an astounding rate (Kaya & Bulut, 2022; Tahiru & Agbesi, 2021). In education, AI creates innovative solutions for teaching and learning across various contexts. AI in education does not aim to replace human teachers with humanoid robots; rather, it focuses on employing computer intelligence to assist teachers and students, thereby improving and enhancing the educational system (Kaya & Bulut, 2022). AI has the potential to address significant issues in education, including the development of innovative teaching and learning approaches and the advancement towards achieving Sustainable Development Goal 4, which focuses on quality education (Tahiru & Agbesi, 2021).

The education system employs a variety of AI tools that shape the educational experience. The AI chatbot system is one of the most widely used tools to support teaching and learning activities (Okonkwo & Ade-Ibijola, 2021). According to Hwang and Chang (2023: 4099), chatbots are a model of technology application that effectively promotes interpersonal communication and learning. They provide various types of information and knowledge through interactive methods and user-friendly interfaces, and they can even serve as tools for personal consultation. Okonkwo and Ade-Ibijola (2021:1) further state that chatbots are conversational and interactive agents that provide immediate answers to users. They are often referred to as "virtual assistants" or "virtual agents" and can operate across diverse mediums (Antony & Ramnath, 2023, p. 8).

Educators can utilise chatbot systems to facilitate teaching through classroom or online platforms using various technologies (Thomas, 2020). Chatbots act as processors and mentors, conveying knowledge to either novices or professionals by analysing their learning patterns and adapting to their pace through a sequence of messages. Artificial intelligence is the technology employed in such devices, which replicates how humans learn to reason and communicate (Thomas, 2020). A chatbot can be defined as an intelligent agent that engages with a user by answering a series of questions and providing relevant responses (Okonkwo & Ade-Ibijola, 2021). It is also a computer programme that simulates and processes human communication, allowing users to interact with digital devices as if conversing with real people (Tahiru & Agbesi, 2021). A chatbot is a discussion technique that promotes collaborative learning, being a system that automatically responds to human questions, queries, or prompts (Okonkwo & Ade-Ibijola, 2021; Tahiru & Agbesi, 2021). Some of the most well-known AI chatbots in the market include ChatGPT, Bing AI, Google Bard, Perplexity, Microsoft Copilot, and Grammarly, to name but a few.

1.1 Problem statement

During and after the COVID-19 pandemic, students appeared to be more exposed to technology and AI-enhanced learning, leading to an expansion of artificial intelligence in education. The use of AI chatbot systems in education also increased. Chatbots are among the most effective ways to improve and promote a more personalised learning experience (Celik, 2023). AI chatbots provide fresh pedagogical options for learning, and many students are beginning to take advantage of this technology. They ensure learners receive timely feedback and broaden learning possibilities (Celik, 2023; Okonkwo & Ade-Ibijola, 2021). Furthermore, chatbots can enhance student engagement and support while significantly reducing teachers' administrative workload, allowing them to focus on curriculum development and research (Thomas, 2020).

Teachers worldwide are starting to recognise the efficiency and adaptability of AI chatbots in their daily teaching tasks, despite some lingering scepticism and hesitation regarding these tools. Innovative lesson creation no longer requires technological expertise on the part of teachers, as these

chatbots are designed to communicate with users in their native language and can generate creative output from basic input (Celik, 2023). Nowadays, chatbots can assist with various pedagogical tasks for everyone, ranging from creating personalised learning recommendations and lesson plans to brainstorming and providing feedback (Kaya & Bulut, 2022; Tahiru & Agbesi, 2021; Thomas, 2020).

However, rapid technological advancements typically bring a range of risks and issues that often outpace policy discussions and regulatory frameworks. The successful integration of any technological advancement and application in education depends on teachers' knowledge (Kaya & Bulut, 2022). While technology in general, and AI chatbots in particular, can be beneficial in education, their successful integration relies on the knowledge and skills of teachers (Celik, 2023). Teachers must ensure that these technologies are not harmful, cannot be misused, and are useful in ways that further the achievement of essential educational goals (Hwang & Chang, 2023). They should also make certain that learners do not develop negative habits that exploit these technologies to the detriment of their educational development. Both technological and pedagogical knowledge play a crucial role in the successful integration of technology in general, and AI chatbots in particular (Celik, 2023).

Past research has not examined teachers' knowledge of the pedagogical use of AI tools like chatbots in the classroom (Hwang & Chang, 2023). As prospective educators, student teachers must be fully aware of the potential of AI chatbots in education and understand how to integrate these tools into their classroom practices pedagogically. This study argues that student teachers must possess the necessary knowledge to understand, justify, and evaluate the results presented by these AI chatbots.The ability to justify and evaluate these results can be grounded in the student teachers' content, pedagogical, and technological knowledge. This is important because AI chatbots, despite their value in education, are not infallible and may make systematic and repeatable errors.Some of these errors may discriminate against students from diverse races and cultures, thus undermining the inclusivity of education. Despite the significance of teachers and student teachers in utilising these technologies, little is known about the expertise required to use AI chatbots effectively. Consequently, there is a lack of studies measuring student teachers' professional knowledge of AI chatbots. Further evaluation of AI chatbots from the perspective of teachers, particularly in pre-service training, is needed. Therefore, there is a lack of understanding of how student teachers comprehend and perceive AI chatbots.

1.2 Research questions

Two primary research questions guide this study. These questions explore student teachers' understanding and perceptions of deploying AI chatbots in their classes. The aim is to determine the knowledge dimensions of student teachers regarding the integration of AI chatbots in classroom practices. These knowledge dimensions will be analysed in relation to the prescripts of the Technological Pedagogical and Content Knowledge (TPACK) framework. *Research Question 1:* What are artificial intelligence (AI) chatbots, and how can they be used for teaching and learning? What are the benefits of AI chatbots in education? *Research Question 2:* How knowledgeable are student teachers about using AI chatbots in classroom practices?

What technological knowledge is needed to integrate AI chatbots in the classroom? What technological pedagogical knowledge (TPK) is needed to integrate AI chatbots in the classroom? What technological content knowledge (TCK) is necessary to integrate AI chatbots in the classroom? What technological pedagogical and content knowledge (TPACK) is required to integrate AI chatbots in the classroom? The first question examines student teachers' viewpoints and understanding of AI chatbots for classroom practices, primarily to determine their overall comprehension of these technological systems and applications, i.e., TK. At the same time, the second question investigates the expertise required to integrate AI chatbots into their teaching and classroom practices. It encompasses their TPK, TCK, and TPACK in relation to the integration of AI chatbots in the

classroom. These questions will indicate what knowledge student teachers still need to acquire in pre-service training before using AI chatbots in their teaching practices.

2. Theoretical Framework

Currently, several approaches are utilised to train student teachers in effective technological integration (Kimmons et al., 2020). These include, among others, the Levels of Technology Integration (LoTi), Technology Acceptance Model (TAM), Substitution-Augmentation-Modification-Redefinition (SAMR), Replacement Amplification Transformation (RAT), Technological Pedagogical Content Knowledge (TPACK), Technology Integration Planning (TIP), Technology Integration Matrix (TIM), and, most recently, Passive, Interactive, Creative, Replacement, Amplification, Transformation (PICRAT) (Kimmons et al., 2020). This study employs the TPACK framework from the above approaches because it is a suitable model that aligns with the four components of ICT integration in the classroom: what, how, why, and who/where/when. Technological Pedagogical Content Knowledge (TPACK) is a teacher knowledge model designed to help teachers effectively teach with technology (Mishra & Koehler, 2006). This framework expands Lee Shulman's Pedagogical Content Knowledge (PCK) concept, which includes the use of technology in schools (Mishra & Koehler, 2006; Shulman, 1986, 1987).

Integrating ICT in education necessitates understanding the three primary domains of a learning environment: content, pedagogy, and technology. Content, pedagogy, and technology are the three knowledge dimensions that form the basis of the TPACK framework (Mishra & Cain, 2013). The TPACK framework is thus the interplay of the aforementioned knowledge domains in all acquisition modalities to develop objective knowledge essential for 21st-century classrooms (Koehler et al., 2013; Mishra & Koehler, 2006). The TPACK model is shown diagrammatically as follows:

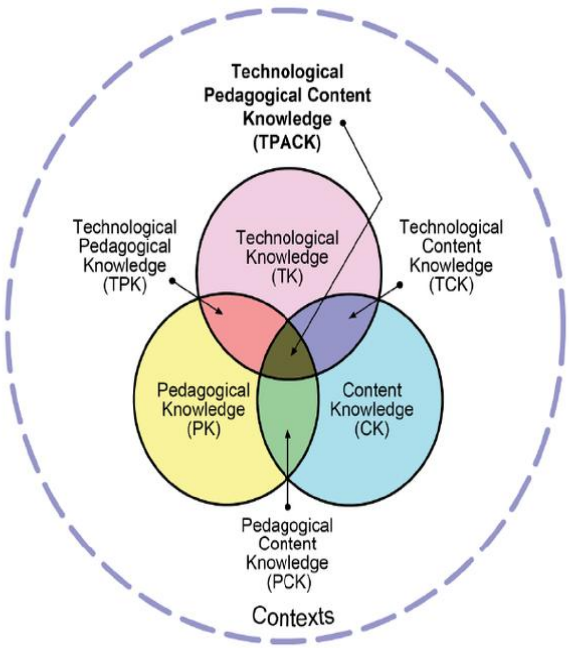

Figure 1: *TPACK model* (Mishra & Koehler, 2006)

Figure 1 depicts the TPACK structure along with its seven knowledge domains. This framework comprises three essential components: content, pedagogy, and technology (Mishra & Koehler, 2008, 2006). Additionally, these three components are used in pairs, leading to the formation of three more components: Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), and Technological Pedagogical Knowledge (TPK). The remaining components combine to form the

overarching framework known as Technological Pedagogical Content Knowledge (TPACK) (Mishra & Koehler, 2008, 2006).

The first knowledge domain within this framework is Content Knowledge (CK). This domain refers to the comprehensive understanding of the subject matter that teachers must teach. Educators must possess a solid comprehension of the material they are about to deliver (Koehler et al., 2013; Mishra & Koehler, 2006; Shulman, 1987). The second knowledge domain is Pedagogical Knowledge (PK), which encompasses a deeper grasp of the strategies, methods, and processes that instructors should employ in teaching their subject specialisations (Koehler et al., 2013; Mishra & Koehler, 2006; Shulman, 1987). The third knowledge domain is Pedagogical Content Knowledge (PCK), which refers to the knowledge and understanding of the subject matter being taught and the pedagogy associated with it. PCK aligns with Shulman's (1986: 4) assertion that "real teaching requires an understanding of both content and pedagogy."

This is followed by the fourth domain, Technological Knowledge (TK). In 2006, Mishra and Koehler introduced the technology component to Shulman's (1986) original PCK framework. They defined this knowledge as the standard understanding of technology and the skills necessary to operate technological tools (Mishra & Koehler, 2008, 2006). The fifth knowledge domain is Technological Content Knowledge (TCK), which denotes the teacher's understanding of the interplay between technology and content, specifically how they impact and constrain each other (Mishra & Koehler, 2008, 2006). The sixth domain is Technological Pedagogical Knowledge (TPK), representing the relationship between technology and pedagogy. It is described as the teacher's expertise and understanding of using technological devices to achieve pedagogical goals (Koehler et al., 2013; Mishra & Koehler, 2006). Finally, Technological Pedagogical Content Knowledge (TPACK) is the culmination of the aforementioned knowledge bases. TPACK (pronounced "t-pack") is the latest form of knowledge that transcends the essential components of content, pedagogy, and technology in teaching and learning (Koehler et al., 2013; Mishra & Koehler, 2006).

This theory was chosen because it enables the researcher to assess how knowledgeable student teachers are about integrating AI chatbots. This study focuses on the knowledge and skills required to use AI-based tools; therefore, attention will be directed solely towards TK-related knowledge domains: TK, TCK, TPK, and TPACK. The framework allows the researcher to explore the various dimensions of student teachers' knowledge. The TPACK framework serves as a model that facilitates the assessment of student teachers' understanding regarding the integration and infusion of different technologies in education.

3. Methodology

3.1 Research paradigm

This study is located in the interpretivism paradigm because of its distinct characteristic that reality consists of people's encounters with the world around them (Maree, 2007). Also, people build the social world by sharing meanings, engaging with, and relating to one another (Maree, 2007). According to the interpretive paradigm, the reason for doing research is to understand human nature. Thus, this study was undertaken to understand and interpret student teachers' understanding of Artificial Intelligence (AI) chatbots and their use in teaching and learning practices. The interpretive paradigm's ontological assumptions are that various socially produced realities exist and that reality is constructed via interactions with other humans (Junjie & Yingxin, 2022; Creswell, 2013). Individuals' everyday routines, conversations with fellow human beings, discussions, and texts that people read help them make sense of their social context and reality (Alharahsheh & Pius, 2020; Creswell, 2013). Therefore, reality exists because of human interactions and social engagement (Alharahsheh & Pius, 2020; Creswell, 2013). The interpretive paradigm's epistemological dimension states that the world is comprehended through mental processes of interpretation. This is influenced

by social interactions within a social context (Junjie & Yingxin, 2022; Alharahsheh & Pius, 2020; Creswell, 2013). The nature of knowledge is individualized. Thus, individuals participating in the research process develop knowledge through experiences in real-life or natural contexts (Junjie & Yingxin, 2022; Thanh & Thanh, 2015; Creswell, 2013).

Furthermore, interpretivists believe that knowledge and meaning are acts of interpretation; hence, no objective knowledge exists without thinking and reasoning humans (Thanh & Thanh, 2015). Again, the researcher and the participant are involved in a personal process of talking, listening, reading, and writing. This leads to more personalised, interactive data collection techniques (Junjie & Yingxin, 2022; Thanh & Thanh, 2015). These attributes enabled me, as a researcher, to construct reality through encounters with student teachers, grasp situations through intellectual processes, and reach conclusions using the abilities of listening, reading, and writing.

3.2 Research design

In line with the chosen paradigm, this study used qualitative research methods in the form of Interpretative Phenomenological Analysis (IPA). IPA is ideal for this paper since it is a qualitative research method focusing on understanding how people make meaning of their lived experiences. IPA is particularly beneficial for analysing individuals' subjective experiences and determining the meanings they ascribe to those experiences (Tuffour, 2017). IPA is a qualitative research approach used to analyse textual data, primarily in psychology, sociology, and healthcare (Larkin et al., 2006). However, in recent times, this approach, according to Tuffour (2017), has become the predominant qualitative research methodology in many academic disciplines. It has acquired importance across multiple academic domains and is renowned for its relevance in researching existential experiences (Antony & Ramnath, 2023).

IPA is based on phenomenology, which aims to understand how humans experience, interpret, and make sense of their environment (Tuffour, 2017). It takes an interpretive approach, meaning that the researcher seeks to comprehend participants' experiences from their perspectives (Antony & Ramnath, 2023). The sample size typically consists of five to fifteen participants, which enables researchers to delve deeply into each participant's experiences, exploring the richness and complexity of their narratives (Eatough & Smith, 2017). IPA data is primarily gathered through in-depth, semi-structured interviews with participants (Pietkiewicz & Smith, 2014). These interviews allow participants to articulate their experiences in their own words, providing researchers with extensive insights into their subjective realities (Antony & Ramnath, 2023; Eatough & Smith, 2017). Analysis involves identifying patterns, themes, and meanings within and between cases (Eatough & Smith, 2017; Pietkiewicz & Smith, 2014). Lastly, the IPA framework acknowledges the double hermeneutic nature of qualitative research, where researchers evaluate participants' perceptions of their experiences. While engaging with participants' accounts, the researcher recognises that interpretation is subjective (Antony & Ramnath, 2023; Eatough & Smith, 2017; Tuffour, 2017).

3.3 Population and sample

This study focused on student teachers' perceptions at the University of Technology in South Africa. To collect thorough data from this demographic and get a more detailed picture of the issue under investigation, the target population was student teachers who were approached and interviewed to respond to open-ended self-administered questions. Based on the abovementioned characteristics, the study employed IPA using a purposive sample of 11 student teachers for a Bachelor of Education (B.Ed.) degree in their fourth year of study. The sample consisted of five (45%) males and six (55%) females. Among these, four (4) participants specialised in Economic and Management Science education, three (3) specialised in Technology education, and four (4) specialised in Natural Science education.

Purposive sampling is commonly employed in qualitative research to allow the researcher to focus on population characteristics relevant to the study objectives. This sampling is also subjective, selective, or judgemental (Cohen et al., 2017). The researcher deliberately selects its units. The units' traits or qualities clearly explain and help to understand the study's fundamental concept and questions (Denzin & Lincoln, 2011; Cohen et al., 2017). The participants sampled for this study had relevant information and practical experiences related to the issue under examination, making them well suited for the study.

To conduct this research, permission was sought from the university, and the researcher adhered to the university's ethical guidelines throughout the search process. Before conducting the interviews, the researcher obtained informed consent from the participants and assessed their willingness to engage in the study. Participants were guaranteed that their personal information would be protected, and measures were taken to ensure the privacy and security of their data.

3.4 Data collection

Data for this study was collected using individual interviews conducted face-to-face between March and April 2024. The researcher employed semi-structured interviews, which were preferred over structured and unstructured formats due to their flexibility in varying the structure of questions (Cohen et al., 2017; Denzin & Lincoln, 2011). Ten semi-structured questions were developed in advance, encompassing themes such as a basic understanding of AI, examples of AI chatbots, the use of AI chatbots at their university, student usage of AI chatbots, and expectations for AI chatbot functionality. Additionally, personal questions regarding the participant's years of experience with AI chatbots, their experiences with chatbot usage in classrooms, and other spontaneous inquiries were posed throughout the interview to clarify responses. To maintain structure during the interviews, the researcher allowed for some flexibility in deviating from the list to explore significant themes further (Roberts, 2020). Probing questions were also utilised to keep participants engaged, summarise topics, manage the flow of conversation, and ensure understanding. According to Roberts (2020), probes are intended to maintain engagement, capture critical ideas, and facilitate seamless conversational flow during interviews. By employing these interviewing methods, the researcher aimed to elicit thoughtful, detailed responses from participants, allowing them to share their expertise and experiences with AI chatbots.

3.5 Data analysis

The study utilised the Systematic Text Condensation (STC) method, a widely employed strategy within the framework of IPA, to evaluate interview data. Malterud (2012) developed the STC qualitative research method, which is primarily used for examining qualitative data from textual materials, focus groups, and interviews. Due to its descriptive and exploratory nature, this approach is suitable for thematic cross-case analysis of various qualitative data sources, such as written texts and interview studies (Malterud, 2012). It provides a practical strategy while drawing on phenomenological concepts. Its aim is to condense and synthesise textual data into a manageable format while retaining the core meanings and themes. Through a systematic process of data reduction, coding, and abstraction, STC enables researchers to identify themes and patterns throughout the dataset (Lindgren et al., 2020; Malterud, 2012).

With this method, researchers have the flexibility to employ different theoretical frameworks. By integrating the STC approach into an IPA framework, researchers can systematically analyse qualitative data while capturing the intricacies and depth of individual experiences. This approach facilitates a comprehensive examination of the themes and significance that emerge from participants' narratives, thereby enriching our understanding of the phenomenon being studied (Lindgren et al., 2012; Malterud, 2012).

4. Findings and Discussions

Exploring student teachers' attitudes toward using Artificial Intelligence (AI) chatbots in classroom settings revealed five primary themes: familiarisation, utilisation, specialisation, professionalisation, and ethics. Each theme provides valuable insights into the various roles of AI chatbots in teacher training and other contexts, highlighting the intricate interplay between AI chatbots and the realm of education. The theme of "familiarisation" examines the basic understanding of AI and AI chatbots, specifically focusing on student teachers' knowledge of their background, nature, and technological composition. For example, among others, the following responses were provided by student teachers:

> *ST 1: "ChatGPT is an AI tool that helps you to find more information about things you do not understand. It can be used for academic purposes or in one's everyday life to seek advice about difficult situations."*
>
> *ST 4: "This is basically artificial intelligence in a robot form. This is like a source where we can get information. This robot is information-rich; it can communicate with a human in a natural, human-like way. People currently have their personal AT in their devices; it turns out to be their friends, but it doesn't have gender and feelings."*

The respondents have a faint idea of what AI chatbots are, even though they cannot explain them in more technical terms, i.e., technical knowledge (TK). Regarding the chosen theoretical framework, it is evident that teachers lack technical knowledge (TK) associated with AI chatbots because TK focuses on understanding how to engage with AI-based technologies and use their essential functionalities (Celik, 2023). This component attempts to test student teachers' familiarity level with the technical capabilities of AI-based solutions. The respondents' responses did not reflect the required levels of TK.

Regarding the theme of "usage," the respondents showed a considerably higher level of understanding. Their understanding revolved around the general usage of different AI chatbots, for example:

> *ST 3: "I used ChatGPT and a video chatbot called ScreenApp."*
>
> *ST 5: "I used ChatGPT to help me generate classwork activities for my learners."*
>
> *ST 9:" I used school hack to summarise the units I'm teaching. I even use it to create low-order questions. You can just upload your information, and it will create questions for you."*

While AI chatbots can be used for general purposes, they can also be used for specialised subject tasks. With the theme of "specialisation," student teachers showed how they can use AI chatbots to tackle some classroom-related practices in their specialised subject content. This aligns with the technological pedagogical knowledge (TPK) proposed by the theoretical framework above. Technological pedagogical knowledge addresses the knowledge of pedagogical affordances of AI-based systems, such as personal and immediate feedback and monitoring students' learning (Celik, 2023). Most respondents indicated using AI chatbots for pedagogical purposes in specialised subjects. For example, they indicated:

> *ST 1: "School hack - it is an AI chatbot that you can use to solve equations."*
>
> *ST 6:" I use an AI app found in Google Pay, and WhatsApp APP called My Pi. It helps me prepare for the lesson and plan the lesson's activity."*
>
> *ST 8: "As a science teacher, I found the ChatGPT to be doing practical tasks easy, relevant, and age-appropriate. I use them in a way that makes sense to my learners so that at the end of the unit, all learning outcomes are made."*

> *ST 10: I used the ChatGPT to compile and develop my lesson plans, it made my work very easy because I did not need to think deep about preparing my everyday lessons."*

The student teachers' responses showed that they could align the use of AI chatbots with their pedagogical practices, which resulted in the development of their TPK.

In line with the theme of "professionalism," the indication is that student teachers can use AI chatbots effectively to influence their pedagogical practices and demonstrate a professional posture towards their work. According to Celik (2023: 4), "TPACK is regarded as the core knowledge domain. It measures teachers' professional knowledge to select and use suitable AI-based tools (e.g., intelligent tutoring systems) for performing a teaching strategy (e.g., monitoring and timely feedback) to accomplish the instructional goals in a particular domain." In line with this theme, the participants responded as follows:

> *ST 7: "When I was preparing my lessons plans, I had a challenge with coming up with expanded opportunities for my lesson and also how I can identify prior knowledge from my learners, so I would as ChatGPT to give me examples of those and it came to my rescue."*
>
> *ST 11: As a mathematics teacher, I used to develop my lessons on HTML. It developed doable, quick and understandable lesson plans of which I did not think of. It gave me all the answers I needed for my lesson plan and even estimated the time duration of the lesson. I also used it to prepare PowerPoint slides as form of notes or summary of the lesson I was teaching. When it comes to activities, it was of great help since it generated all the classroom activity questions and I only had to choose the one that complemented the lesson of the day."*
>
> *ST 8: I used AI as a means for supporting and simplifying my lessons so that I should noy rely on the textbook alone. I remember I was going to teach welding machines in grade 11. The textbook explained the older machines, so I used AI chatbot to get the modern alternators which they are exposed to at home so that I can scaffold them from known to unknown."*

The responses indicated a clear attitude towards professionalism and a commitment to achieving lesson outcomes. Student teachers demonstrated that, when using AI chatbots, they can approach their teaching professionally and showcase their TPACK. Their responses suggest that AI chatbots are employed for personalised learning, classroom administration, and student analytics.

Additionally, in line with the theme of "ethics," the respondents recognised that AI chatbots, while offering significant benefits in efficiency and accessibility, also raise several ethical concerns (Tuffour, 2017). These issues include the potential for response bias, the risk of spreading misinformation, and privacy implications. It is crucial to ensure that chatbots are designed and operated transparently, with accountability for their outputs. Furthermore, teachers—specifically student teachers—must be vigilant in implementing measures to protect user data and mitigate biases, thereby promoting fairness and trust in AI interactions (Celik, 2023).

The TPACK framework offers a comprehensive perspective for analysing student teachers' attitudes, beliefs, and experiences regarding the integration of AI chatbots. The study's results indicate that student teachers generally hold a positive outlook on using AI chatbots in the classroom. Many acknowledged the potential of these technologies to enhance student engagement, support personalised learning, and simplify administrative responsibilities (Smutný & Schreiberova, 2020). However, student teachers also expressed concerns about incorporating AI chatbots, citing potential technical issues, the need for comprehensive training and support, and the importance of maintaining a harmonious balance between technology and human interaction (Merelo et al., 2022; K et al., 2018).

Specifically, student teachers highlighted the importance of developing a deep understanding of the technological aspects of AI chatbots, including their capabilities, limitations, and potential biases

(Tan & Subramonyam, 2023). They also emphasised the need to carefully align pedagogical approaches with the affordances of the technology to ensure meaningful and effective integration (K et al., 2018; Tan & Subramonyam, 2023). Furthermore, student teachers underscored the importance of maintaining strong content knowledge to leverage AI chatbots effectively in subject-specific contexts. This study provides valuable insights for teacher education programmes, policymakers, and educational technology developers. By understanding the nuanced perspectives of student teachers, stakeholders can develop targeted support and guidance to empower educators in navigating the evolving landscape of AI-powered technologies in the classroom.

5. Limitations of the Study

This study provides valuable insights into pre-service teachers' perspectives regarding the use of AI chatbots in the classroom. However, several limitations should be considered when interpreting the findings. One primary limitation is the small sample size; the study was conducted with a limited number of participants, which may restrict the generalisability of the findings to a broader population of student teachers. Additionally, the study was conducted in a specific geographic location, further limiting the ability to extrapolate the results to other contexts. Another limitation is the potential for bias in the data collection and analysis. As an interpretative phenomenological analysis, the study relied heavily on the researcher's subjective interpretations, which may have influenced the findings. Although the researcher made efforts to mitigate this through triangulation and member checking, the potential for bias remains a concern.

6. Conclusions and Recommendations

The study on student teachers' perspectives of AI chatbots for classroom practices revealed several crucial points. The findings indicate that using AI-based chatbots in educational settings can significantly influence student learning and engagement. AI chatbots can increase student motivation and reduce feelings of loneliness, especially in online learning contexts. They can also provide students with rapid feedback, support, and tailored assistance, allowing teachers to focus more on individualised instruction and support. Additionally, AI chatbots can foster deeper learning by answering student inquiries and promoting their academic and personal well-being in an accessible and participatory manner. Thorough planning and seamless integration of these technologies are necessary to successfully incorporate AI chatbots in the classroom. Educators must ensure that the chatbots align with students' learning objectives and specific needs. The study indicates that AI chatbots have the potential to revolutionise classroom practices. However, their deployment must be meticulously planned and executed to maximise the benefits for student learning and growth. Further research is required to investigate the long-term effects of AI chatbots in educational environments and to establish best practices for their successful implementation.

7. Declarations

Funding: This research did not receive any external funding. The CUT research office covered the Article Processing Charge (APC).

Acknowledgements: I acknowledge Prof. B. Dube, the Director of the Centre for Diversity in Higher Education at the Central University of Technology, for his guidance in the compilation of this manuscript.

Conflict of Interest: The author declares no conflict of interest.

Data Availability: The data are not publicly available due to confidentiality agreements with participants and ethical restrictions imposed by the Institutional Review Board. However, de-identified data can be made available from the corresponding author upon reasonable request, subject to approval by the ethics committee.

References

Alharahsheh, H. H., & Pius, A. (2020). A review of key paradigms: Positivism vs. interpretivism. *Global Academic Journal of Humanities and Social Sciences*, *2*(3), 39-43. https://doi.org/10.36348/gajhss.2020.v02i03.001

Antony, S., & Ramnath, R. (2023). A phenomenological exploration of students' perceptions of AI chatbots in higher education. *IAFOR Journal of Education*, *11*(2), 7-38.

Celik, I. (2023). Towards intelligent-TPACK: An empirical study on teachers' professional knowledge to ethically integrate artificial intelligence (AI)-based tools into education. *Computers in Human Behavior*, *138*, 107468. https://doi.org/10.1016/j.chb.2022.107468

Cohen, L., Manion, L., & Morrison, K. (2017). *Research methods in education*. Los Angeles: SAGE Publications.

Creswell, J. W. (2013). *Qualitative inquiry & research design: Choosing among five approaches*. Thousand Oaks: SAGE Publications.

Denzin, N., & Lincoln, Y. S. (Eds.). (2011). *The SAGE handbook of qualitative research* (4th ed.). Thousand Oaks: SAGE Publications.

Eatough, V., & Smith, J. A. (2017). Interpretative phenomenological analysis. In W. Stainton Rogers & C. Willig (Eds.), *The SAGE Handbook of Qualitative Research in Psychology* (pp. 193–209). Sage Publications.

Hwang, G. J., & Chang, C. Y. (2023). A review of opportunities and challenges of chatbots in education. *Interactive Learning Environments*, *31*(7), 4099–4112. https://doi.org/10.1080/10494820.2021.1952615

Junjie, M., & Yingxin, M. (2022). The discussions of positivism and interpretivism. *Online Submission*, *4*(1), 10–14. https://doi.org/10.36348/gajhss.2022.v04i01.002

K, B. P., Too, J., & Mukwa, C. W. (2018, July 1). *Teacher attitude towards use of chatbots in routine teaching*. Horizon Research Publishing, *6*(7), 1586-1597. https://doi.org/10.13189/ujer.2018.060719

Kaya, N., & Bulut, S. (2022). Artificial intelligence and education: An overview. *Psychology & Psychological Research International Journal, 7*(3), 1-7. https://doi.org/10.23880/pprij-16000303

Kimmons, R., Graham, C. R., & West, R. E. (2020). The PICRAT model for technology integration in teacher preparation. *Contemporary Issues in Technology and Teacher Education*, *20*(1), 176–198.

Koehler, M. J., Mishra, P., & Cain, W. (2013). What is technological pedagogical content knowledge (TPACK)? *Journal of Education*, *193*(3), 13-19. https://doi.org/10.1177/002205741319300303

Larkin, M., Watts, S., & Clifton, E. (2006). Giving voice and making sense in interpretative phenomenological analysis. *Qualitative Research in Psychology*, *3*(2), 102–120. https://doi.org/10.1191/1478088706qp062oa

Lindgren, B. M., Lundman, B., & Graneheim, U. H. (2020). Abstraction and interpretation during the qualitative content analysis process. *International Journal of Nursing Studies*, *108*, 103632. https://doi.org/10.1016/j.ijnurstu.2020.103632

Maree, K. (2007). *First steps in research*. Pretoria: Van Schaik Publishers.

Malterud, K. (2012). Systematic text condensation: A strategy for qualitative analysis. *Scandinavian Journal of Public Health*, *40*(8), 795–805. https://doi.org/10.1177/1403494812465030

Merelo, J. J., Castillo, P. A., Mora, A. M., Barranco, F., Abbas, N., Guillén, A., & Tsivitanidou, O. (2022, January 1). Chatbots and messaging platforms in the classroom: An analysis from the teacher's perspective. *Cornell University. https://doi.org/10.48550/arxiv.2201.10289*

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 10-17. https://doi.org/10.1111/j.1467-9620.2006.00684.x

Mishra, P., & Koehler, M. J. (2008). Introducing technological pedagogical content knowledge. In *Proceedings of the Annual Meeting of the American Educational Research Association*. New York City, NY. March 24–28, 2008.

Okonkwo, C. W., & Ade-Ibijola, A. (2021). Chatbot applications in education: A systematic review. *Computers and Education: Artificial Intelligence, 2,* 100033. https://doi.org/10.1016/j.caeai.2021.100033

Pietkiewicz, I., & Smith, J. A. (2014). A practical guide to using interpretative phenomenological analysis in qualitative research psychology. *Psychological Journal, 20*(1), 7-14. https://doi.org/10.14691/CPPJ.20.1.7

Roberts, L. M. (2020). Interviewing: The art of science. In C. E. Jongensen, K. M. R. Tackett, & J. L. Suizzo (Eds.), *Handbook of research methods in human development* (2nd ed., pp. 107–128). Guilford Press.

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*(2), 4-14. https://doi.org/10.3102/0013189X015002004

Shulman, L. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review, 57*(1), 1–23. https://doi.org/10.17763/haer.57.1.j463w79r56455411

Smutný, P., & Schreiberova, P. (2020, July 1). Chatbots for learning: A review of educational chatbots for Facebook Messenger. *Computers & Education, 151,* 103862. https://doi.org/10.1016/j.compedu.2020.103862

Tahiru, F., & Agbesi, S. (2021). The future of artificial intelligence in education. In *Digital technology advancements in knowledge management* (pp. 187-194). IGI Global.

Tan, M., & Subramonyam, H. (2023, January 1). More than model documentation: Uncovering teachers' bespoke information needs for informed classroom integration of ChatGPT. In *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems*(Article No. 269, pp. 1–19). Cornell University. https://doi.org/10.1145/3613904.3642592

Thanh, N. C., & Thanh, T. T. (2015). The interconnection between interpretivist paradigm and qualitative methods in education. *American Journal of Educational Science, 1*(2), 24-27.

Thomas, H. (2020). Critical literature review on chatbots in education. *International Journal of Trend in Scientific Research and Development*, *4*(6), 786–788.

Tuffour, I. (2017). A critical overview of interpretative phenomenological analysis: A contemporary qualitative research approach. *Journal of Healthcare Communications, 2*(4), 52. https://doi.org/10.4172/2472-1654.100093